

Calculation of the baseline load

“In the TMDL report, Sections 2.2.1-2.2.4 describe four different sampling programs that were conducted in support of this TMDLs. Section 2.2.1 details the District of Columbia Stormwater Outfall Monitoring, which occurred between March and August 2009. Section 2.2.2 details the Montgomery and Prince George’s County Stormwater Outfall Monitoring, which occurred between October 2008 and July 2009. Section 2.2.3 details the District of Columbia In-Stream Monitoring, which occurred between August 2007 and June 2008. Section 2.2.4 details the Montgomery and Prince George’s County In-Stream Monitoring, which occurred between June 2008 and April 2009.” TMDL_AR 3102.

Land Use Data (TMDL_AR 3017)

– 2002 Land Use/Land Cover for Maryland developed by the Maryland Department of Planning.

- Land use coverage data for the District developed by the District’s Office of Planning (2005)

Each jurisdictions employed both stormwater outfall trash collection and in-stream trash counts.

TMDL_AR 3018

Unreasonable and cost-prohibitive to monitor at every single MS4 outfall. Monitoring was conducted at a subset and efforts were made to select locations that represented specific land use drainage areas. This was done to avoid creating one mixed use loading rate for the entire watershed, which would have been less accurate. TMDL_AR 3090

District of Columbia Stormwater Outfall Monitoring (in conjunction with AWS) (Section 2.2.1)

- Point source loading rates were established based on land use in the associated drainage areas TMDL-AR3018
- 10 storm sewer drainage areas selected for monitoring TMDL-AR3018
 - Each represent drainage from a specific land use (using District Office of Planning data), and data from these used to develop trash loading rates for each type of land use TMDL-AR3018
- Trash traps installed at each of the 10 outfalls; netting 1 inch in diameter March – August 2009
 - Annual rainfall for 2009 (46.90 inches) was well above long term average annual rainfall of 39.35 inches and seasonal rainfall averages in 2009 were within an inch of long-term seasonal average, except spring 2009 when 14.24 inches of rain fell, well above the long-term spring average of 9.00 inches. TMDL_AR 3051
 - Emptied subsequent to rainfall events of at least 0.25 inch (enough to mobilize trash through storm sewer system) TMDL-AR3018
 - Used weather station at Eckington Place, NE TMDL-AR3018
 - All items identified, counted and weighed TMDL-AR3018

Montgomery/PG County Stormwater Outfall Monitoring (Section 2.2.2)

- 8 sites selected to encompass general land use types (low-, medium – and high-density residential; commercial; industrial) based on Maryland Dept. Planning 2002 data; Monitoring October 2008-end of July 2009. TMDL_AR 3021
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- Annual rainfall for 2008 (46.49 inches) and 2009 (46.90 inches) was well above long term average annual rainfall of 39.35 inches and seasonal rainfall averages in 2008 and 2009 were within an inch of long-term seasonal average, except spring 2009 when 14.24 inches of rain fell, well above the long-term spring average of 9.00 inches. TMDL_AR 3051
- In cases where Maryland's point source monitoring did not adequately represent a specific land use, the District's data were used, where the land uses could reasonably be assumed to be similar between the jurisdictions. These included open land, forest and agriculture. Maryland's transportation, extractive and base ground land uses were considered to have a loading rate similar to the commercial, institutional and industrial rate in Maryland because these land uses were frequently associated with each other spatially within the watershed.
 - 6 with trash fences (2-inch) plus a sub-sampler (designed to capture 1-inch); sampled roughly monthly TMDL_AR 3021
 - Monitoring performed 2-3 days after rainfall producing measurable runoff; items recorded, catalogued, and weighed; Precip data from nearest long-term weather station in Beltsville, MD TMDL_AR 3021
 - 2 with trash nets; sampled slightly less frequently than monthly. TMDL_AR 3021
 - After rainfall events, trash recorded, catalogued and weighed TMDL_AR 3021

District In-Stream Monitoring (Section 2.2.3 & Section 1.2)

- Worked with AWS to conduct quarterly in-stream trash monitoring; once each season from August 2007 – June 2008 TMDL_AR 3025
 - Annual rainfall for 2008 (46.49 inches) was well above long term average annual rainfall of 39.35 inches and seasonal rainfall averages in 2008 were within an inch of long-term seasonal average. TMDL_AR 3051
- Standardized weights established for all commonly found items. TMDL_AR 3011
- Five transects selected along mainstem Anacostia; four transects on shoreline of Kingman Lake; all nine main perennial tribs monitored TMDL_AR 3025; 3011; trash
- Transects every 500-1000 feet along tributaries TMDL_AR 3025
- Trash counted and recorded by type TMDL_AR 3025
- Transects of trash on land and bridges also conducted; windshield surveys for each stream in an MS4 drainage basin conducted quarterly. TMDL_AR 3012

Montgomery/PG County In-Stream Monitoring (Section 2.2.4)

- 30 stream sampling sites (15 in each county) chosen at random from existing county IBI network; Sampling conducted June 2008-April 2009. Transects of 500 feet along each of 30 segments. TMDL_AR 3029
 - Annual rainfall for 2008 (46.49 inches) and 2009 (46.90 inches) was well above long term average annual rainfall of 39.35 inches and seasonal rainfall averages in 2008 and 2009 were within an inch of long-term seasonal average, except spring 2009 when 14.24 inches of rain fell, well above the long-term spring average of 9.00 inches. TMDL_AR 3051
- Trash counted and recorded by type; large quantities of uniform items were estimated TMDL_AR 3029

Development of Loading Rates and Baseline Loads (Section 4.1)

- Items generally considered too large to move through the storm drain system are considered part of baseline nonpoint source load, and items that would generally be able to move through the storm drain system are considered part of the baseline point source load. TMDL_AR 3034
- DC Point Source Loading Rate
 - o Data normalized to trash loading pounds per acre per year. Then rate of pounds of trash per acre per inch of rain was established for each sampling event at each monitoring location. Average trash pounds per acre per inch for each site calculated using sampling events from March -August 2009. TMDL_AR 3034
 - Since each site associated with specific land use, this provided a loading rate for each land use TMDL_AR 3034
 - o To obtain an annual loading rate, the unit loading rate was multiplied by the average annual rainfall, based on mean annual rainfall at Washington Reagan National Airport over a 5-year period from 1959-2008 (39.13 inches per year) TMDL_AR 3034
 - o Conservative estimate of baseline loads because assumes all land in the watershed contributes to point source trash load TMDL_AR 3049
- DC CSO Loading Rate
 - o Derived from a study associated with DC Water's Long Term Control Plan conducted August 2000-April 2001 – trap installed at CSO 018. TMDL_AR 3035
 - o Contractors changed nets 10 times over course of monitoring period; drained and weighed; rainfall recorded and weight of captured trash normalized to pounds per million gallons. TMDL_AR 3035-36
 - o Used known average overflow volume from Long Term Control Plan to arrive at baseline load from CSOs. TMDL_AR 3045
- DC NPS Loading Rate TMDL_AR 3036
 - o Items considered part of NPS load were tallied for each season and then averaged across the year to establish the annual loading rate for each stream.
 - o Standardized weights were applied to different categories of debris
 - o Trash loading rates were standardized to pounds per 1,000 stream feet and the rate was applied to entire length of each stream
 - o Streams not directly sampled were assigned an annual loading rate developed by calculating mean loading rate from all tributaries.
 - o Conservative estimate of actual loads because entire stream length of all tribs and mainstem were used to calculate NPS loads TMDL AR 3049
- Montgomery/PG Counties Point Source Loading Rates
 - o Trash weights for each sampling event in the trash traps/nets were normalized to pounds of trash per acre on the basis of the size of the contributing drainage area TMDL_AR 3037
 - o Each sampling event was then normalized to pounds/acre/inch of rain (by dividing pounds/acre by each rain amount). TMDL_AR 3037
 - o Trash point source loading rates (pounds/acre/inch) for each sampling event at each site were averaged across the year to obtain a single waste loading rate for each sampling site TMDL_AR 3039

- DC loading rates for parks and open space land use were used for open land, forest and agriculture land uses TMDL_AR 3039
- Conservative estimate of baseline loads because assumes all land in the watershed contributes to point source trash load TMDL_AR 3049
- Montgomery/PG Counties NPS Loading Rate
 - Based on quarterly stream surveys
 - Count per stype of material averaged across all sampling events (4) at each site to obtain a single average count per year for each type of trash for each sampling site. TMDL_AR 3042
 - Trash counts for each material were then averaged across all sites in each county to establish separate loading rates for each county, resulting in two distinct annual loading rate counts per 500 feet of stream in each county TMDL_AR 3042
 - Values in each county extrapolated to all stream miles within that county to get countywide trash loading rates TMDL_AR 3042
 - Conservative estimate of actual loads because entire stream length of all tribs and mainstem were used to calculate NPS loads TMDL AR 3049